What is claimed is:

1. A piston assembly for use in a motor, comprising:

a cylinder having a bore;

an electrically conductive piston reciprocally disposed within the cylinder bore;

a gas cavity formed within the piston; and

one or more gas bearings associated with the piston, each of the one or more gas bearings including an aperture formed within the piston and an electrically conductive tubular member extending through the aperture, the tubular member having a lumen in communication between the gas cavity and the cylinder bore.

2. The piston assembly of claim 1, wherein the lumen has an inner diameter equal to or less than 0.0020 inch.

3. The piston assembly of claim 1, wherein the lumen has an inner diameter equal to or less than 0.0015 inch.

4. The piston assembly of claim 1, wherein the tubular member has a diameter equal to or less than 0.0200 inch.

5. The piston assembly of claim 1, wherein the tubular member has a length between 0.100 inch and 0.200 inch.

6. The piston assembly of claim 1, wherein the tubular member is press fit into the aperture.

7. The piston assembly of claim 1, wherein the tubular member is a composite tube composed of an inner tubular member and an outer tubular member.

8. The piston assembly of claim 1, wherein the one or more gas bearings comprises a plurality of gas bearings.

9. The piston assembly of claim 8, wherein the plurality of gas bearings are equidistantly disposed around a circumference of the piston.

10. The piston assembly of claim 1, further comprising a unidirectional check valve in communication between the exterior of the piston and the gas cavity.

11. The piston assembly of claim 1, wherein each of the one or more gas bearings further comprises a bearing space formed within the piston, wherein the lumen is in communication with the cylinder bore via the bearing space.

12. A piston assembly for use in a motor, comprising:

a cylinder having a bore;

an electrically conductive piston reciprocally disposed within the cylinder bore;

a gas cavity formed within the piston; and

one or more gas bearings associated with the piston, each of the one or more gas bearings including an aperture formed within the piston and an electrically conductive composite tube extending through the aperture, the composite tube comprising an outer tubular member and an inner tubular member, the inner tubular member having a lumen in communication between the gas cavity and the cylinder bore.

13. The piston assembly of claim 12, wherein the lumen has an inner diameter equal to or less than 0.0020 inch.

14. The piston assembly of claim 12, wherein the lumen has an inner diameter equal to or less than 0.0015 inch.

15. The piston assembly of claim 12, wherein the inner tubular member has an outer diameter less than 0.010 inch.

16. The piston assembly of claim 12, wherein the inner tubular member has an outer diameter equal to or less than 0.007 inch.

17. The piston assembly of claim 12, wherein the composite tube has a diameter equal to or less than 0.0200 inch.

18. The piston assembly of claim 12, wherein the composite tube has a length between 0.100 inch and 0.200 inch.

19. The piston assembly of claim 12, wherein the composite tube is press fit into the aperture.

20. The piston assembly of claim 12, wherein the outer tubular member is swaged onto the inner tubular member.

21. The piston assembly of claim 12, wherein the one or more gas bearings comprises a plurality of gas bearings.

22. The piston assembly of claim 21, wherein the plurality of gas bearings are equidistantly disposed around a circumference of the piston.

23. The piston assembly of claim 12, further comprising a unidirectional check valve in communication between the exterior of the piston and the gas cavity.

24. The piston assembly of claim 12, wherein each of the one or more gas bearings further comprises a bearing space formed within the piston, wherein the lumen is in communication with the cylinder bore via the bearing space.

25. A cryocooler, comprising:

a compressor unit, including

a piston assembly including a cylinder having a bore, an electrically conductive piston reciprocally disposed within the cylinder bore, a gas cavity formed within the piston, and one or more gas bearings associated with the piston, each of the one or more gas bearings including an aperture formed within the piston and an electrically conductive composite tube extending through the aperture, the composite tube comprising an outer tubular member and an inner tubular member, the inner tubular member having a lumen in communication between the gas cavity and the cylinder bore.

a magnet ring assembly including a cylindrical magnet holder having an inner surface, and a plurality of magnets disposed around the inner surface of the cylindrical magnet holder, the magnet ring assembly being mounted to the piston bracket; and

one or more electrical coils that surround an outer surface of the cylindrical magnet holder of the magnet ring assembly;

a displacer unit in fluid communication with the compressor unit; and

a heat exchange unit between the compressor unit and displacer unit.

26. The cryocooler of claim 25, wherein the lumen has an inner diameter equal to or less than 0.0020 inch.

27. The cryocooler of claim 25, wherein the lumen has an inner diameter equal to or less than 0.0015 inch.

28. The cryocooler of claim 25, wherein the inner tubular member has an outer diameter less than 0.010 inch.

29. The cryocooler of claim 25, wherein the inner tubular member has an outer diameter equal to or less than 0.007 inch.

30. The cryocooler of claim 25, wherein the composite tube has a diameter equal to or less than 0.0200 inch.

31. The cryocooler of claim 25, wherein the composite tube has a length between 0.100 inch and 0.200 inch.

32. The cryocooler of claim 25, wherein the composite tube is press fit into the aperture.

33. The cryocooler of claim 25, wherein the outer tubular member is swaged onto the inner tubular member.

34. The cryocooler of claim 25, wherein the one or more gas bearings comprises a plurality of gas bearings.

35. The cryocooler of claim 34, wherein the plurality of gas bearings are equidistantly disposed around a circumference of the piston.

36. The cryocooler of claim 25, further comprising a unidirectional check valve in communication between the exterior of the piston and the gas cavity.

37. The cryocooler of claim 25, wherein each of the one or more gas bearings further comprises a bearing space formed within the piston, wherein the lumen is in communication with the cylinder bore via the bearing space.

38. A motor, comprising:

a piston assembly including a cylinder having a bore, an electrically conductive piston that is reciprocally disposed within the cylinder bore, and a piston bracket disposed on the end of the piston;

a gas cavity formed within the piston;

one or more gas bearings associated with the piston, each of the one or more gas bearings including an aperture formed within the piston and an electrically conductive tubular member extending through the aperture, the tubular

member having a lumen in communication between the gas cavity and the cylinder bore;

a magnet ring assembly including a cylindrical magnet holder having an inner surface and an annular ledge formed around the inner surface, and a plurality of magnets disposed around the inner surface of the cylindrical magnet holder, each of the plurality of magnets comprising opposing axial edges, one of the axial edges being disposed on the annular ledge, the magnet ring assembly being mounted to the piston bracket; and

a magnetic induction assembly operably coupled to the magnet ring assembly.

39. The motor of claim 38, wherein the magnets are equidistantly spaced from each other.

40. The motor of claim 38, wherein each of the plurality of magnets is arcuate.

41. The motor of claim 40, wherein the cylindrical magnet holder has an inner radius, and each of the plurality of magnets comprises an outer radius of curvature substantially equal to the inner radius of the cylindrical magnet holder.

42. The motor of claim 40, wherein each of the plurality of magnets exhibits an outer arcuate length and an inner arcuate length, the inner arcuate length being less than the outer arcuate length.

43. The motor of claim 38, wherein the plurality of magnets has a radially uniform magnetic polarity.

44. The motor of claim 38, wherein the plurality of magnets is bonded to the inner surface of the cylindrical magnet holder.

45. The motor of claim 38, wherein the cylindrical magnet holder comprises a swaged axial edge opposite the annular ledge, and the other of the axial edges of each of the plurality of magnets is captured by the swaged axial edge of the cylindrical magnet holder.

46. The motor of claim 38, wherein the cylindrical magnet holder is composed of a non-magnetic material.

47. The motor of claim 38, wherein the cylindrical magnet holder is a unibody structure.

48. The motor of claim 38, wherein the magnetic induction assembly comprises:

one or more coils surrounding the piston assembly;

one or more internal laminations adjacent inner surfaces of the plurality of magnets; and

one or more external laminations surrounding the one or more coils and being adjacent to the outer surface of the cylindrical magnet holder of the magnet ring assembly.